

TECHNICAL MEMORANDUM

AMBIENT AIR QUALITY SURVEY

SAULT STE. MARIE

JULY, 1985

ARB-118-86-AQM

JULY, 1986

TD
883.7
.06
B452
1986
MOE

Ontario

Ministry
of the
Environment

E. PICHÉ, Director
Air Resources Branch

Technical Memorandum
Ambient Air Quality Survey
Sault Ste. Marie

July, 1985

ARB-118-86-AQM

Prepared for:

Northeastern Region
Ontario Ministry of the Environment

Prepared by:

R.W. Bell, M.Sc.
Senior Project Scientist
Air Quality and Meteorology Section
Air Resources Branch
July, 1986

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact Service Ontario Publications at copyright@ontario.ca

TABLE OF CONTENTS

	Page
1. Executive Summary	2
2. Introduction	3
3. The Results	
3.1 Meteorological Aspects	5
3.2 Algoma Steel - Main Mill Complex and Coke Ovens	6
3.3 Algoma Steel - Terminal Basins	7
3.4 Domtar Limited	8
3.5 Overnight Measurements	9
3.6 Upwind Monitoring	10
4. Maps and Tables	11

1. EXECUTIVE SUMMARY

Mobile Air Monitoring Units #1 and #2 (MAMu #1 and #2) of the Air Resources Branch undertook a 4-day monitoring programme in Sault Ste. Marie during the last week of July, 1985. The main aims of this programme were to establish air quality parameters downwind of Algoma Steel (its main plant, coke ovens and terminal basins) and Domtar Limited.

From all the environmental data accumulated, no Environmental Guidelines, Standards or Criterion were exceeded or approached.

2. INTRODUCTION:

As per the request of the Northeastern Region, Mobile Air Monitoring Units #1 and #2 (MAMu's #1 and #2) of the Air Resources Branch undertook an ambient air monitoring programme in Sault Ste. Marie during the last four days of July, 1985. The main aims of this programme were to determine air quality profiles downwind of several specific sources - namely the main steel mill complex, coke ovens and terminal basins of Algoma Steel Corporation and the refinery complex of Domtar Limited.

Both MAMu #1 and #2 had the capabilities of measuring, on a continuous basis, a variety of common gaseous contaminants and a complete set of ground-based meteorological parameters. The common contaminants measured included carbon monoxide (CO), oxides of nitrogen (NO_x), sulphur dioxide (SO₂), total reduced sulphur compounds (TRS), non-methane hydrocarbons (TH-M) and ozone (O₃) and the meteorological parameters measured were wind direction and speed, ambient temperature, dewpoint temperature, solar radiation and barometric pressure. In addition, each MAMu had on-board, a dual-capillary column gas chromatographic (GC) system with built-in preconcentrators and adsorbent cartridges which was capable of immediately analyzing (both qualitative and quantitative) up to 126 specific organic compounds that could have been in the sampled air.

The Sampling Programme:

The gaseous emissions originating from the main steel mill complex and the coke oven area of Algoma Steel could not be readily separated. Thus the ground-based, point-of-impingement downwind measurements of these emissions were treated as originating from the same source. Nine monitoring periods comprised this segment of the monitoring programme and approximately 20 hours of ambient air data for the common contaminants and 12 GC samples were acquired.

The terminal basins of Algoma Steel were somewhat isolated from the main steel mill complex and coke ovens and in addition, were very accessible by the MAMu's. As such, a more detailed investigation of the evaporative gaseous emissions from these reservoirs was undertaken. Approximately 2½ hours of ambient air data for the common contaminants (as acquired during two different monitoring periods) and 2 GC samples were acquired off plant property at approximately 50 to 100 metres downwind of these basins. In addition, 4½ hours of common contaminant data (as acquired during 2 other monitoring periods) and 6 GC samples were acquired on plant property and at a height of approximately 2 metres above the basins' surfaces.

MAMu #2 spent an afternoon positioned downwind of Domtar Limited and monitored the gaseous emissions suspected of originating from this refinery complex. Approximately 2½ hours of common contaminant air quality data and 3 GC samples were acquired at this time.

Finally, overnight monitoring was undertaken by both MAMU #1 and #2. These units were "plugged-in" at the transformer/switching station at the corner of Huron and Queen Streets and only common contaminant air quality data (approximately 84 hours of such data) were acquired.

A more detailed description of the actual monitoring periods, sites and sources is presented in Map #1 and Table #1 on pages 12 and 13 respectively.

3. THE RESULTS

3.1 Meteorological Aspects

A low pressure area was centered over Lake Superior and its warm front had pushed through Sault Ste. Marie during the early morning hours of Sunday, July 28. It was overcast (stratocumulus) throughout this day and the winds were southwesterly and relatively weak (i.e. less than 15 km/hr). By mid-afternoon, thunderstorms and rain showers had started to develop in this area. The cold front associated with this low pressure area pushed through Sault Ste. Marie during the night of July 28th and by the following morning, clear atmospheric conditions and brisk WNW winds prevailed. For the 29th and next two days (i.e. up to and including July 31) or for the remainder of the monitoring programme, Sault Ste. Marie was under the influence of a high pressure area. Clear days prevailed with weak to moderate northwesterly winds and the temperatures were in the mid to high 20's. Daytime atmospheric dispersion conditions were excellent and it was evident that only close proximity downwind monitoring of targeted sources would result in appreciable concentrations.

Nighttime monitoring was limited to the plug-in site at Huron and Queen Streets and only common contaminant monitoring was undertaken at these times. Because of the onset of nocturnal inversions during the early morning hours (i.e. periods of calm winds and cool temperatures at the surface), the gaseous emissions from all of the plants, mills, vehicular traffic, etc. in the industrial complex at the south side of Sault Ste Marie were trapped at the lower elevations by this meteorological phenomena. Because of this trapping and inherent atmospheric mixing of these emissions, no impingement zone (i.e. source specific) monitoring was undertaken and higher concentrations of the common contaminants were anticipated.

3.2 Algoma Steel: Main Mill Complex and Coke Ovens

Because of the excellent daytime atmospheric dispersion conditions and the limited accessibility (i.e. the MAMU's remaining off-plant property) it was very difficult to ascertain the impingement zones for emissions from this source and hence place the MAMU's in these zones at the appropriate times.

From the 20 hours of common contaminant data acquired downwind of this source, all measured concentrations were lower than anticipated. In addition, very little odour was perceived by the Environment staff during the 9 monitoring periods that comprised this segment of the monitoring programme. No Environmental Standards or Guidelines were approached or exceeded for any of the monitored common contaminants. As can be seen from Table #2, the maximum 30-minute average concentrations of CO, TRS, SO₂, NO_x and O₃ were only 3.58, 0.015, 0.07, 0.08 and 0.03 ppm (parts per million by volume) respectively. The applicable Environmental Standards and Guidelines for these contaminants are respectively, 5, 0.027, 0.30, 0.25 and 0.10 ppm.

From the 12 GC samples acquired downwind of this source, an average of only 30 different organics were identified and quantified and the average total hydrocarbon loading was only 109 ug/m³ (micrograms per cubic meter). The maximum number of different organics detected in any of these samples was 43 and the maximum loading was 304 ug/m³. From these analyses, the alkane fractional groups accounted for, on the average, 39% (an average loading of 43 ug/m³), the aromatic fractional group 53% (an average loading of 58 ug/m³) and the alkene fractional group 6% (an average loading of 7 ug/m³) of these total hydrocarbon loadings.

For the alkane fraction, the more dominant organics detected were 2-methylpropane (8 ug/m³), butane (9 ug/m³), 2-methylbutane (10 ug/m³) and pentane (7 ug/m³) (all well known products of combustion - esp. from vehicular traffic). For the aromatics, the dominant organic detected was 1-isopropyl-4-methylbenzene (25 ug/m³ - this is also known as para-

cymene). The Ministry does not have any Standards, Criteria or Guidelines for this organic, however from an article by E.E. Sandmeyer, "Humans may experience some irritation if by inhalation, the concentrations approach 200 ppm" - i.e. a mass loading of 1 gram/m³). The BTX's (benzene, toluene and xylenes) reported average loadings of 15, 6 and 5 ug/m³ respectively. The only chlorinated organics detected in any of these samples were chlorobenzene and 4-chlorotoluene but these were only detected in trace amounts or at background concentrations - i.e. at concentrations less than 1 ug/m³.

In summary, for all of the contaminants measured/detected downwind of the steel mill and coke ovens of Algoma Steel, no exceedences of any of the applicable Environmental Regulations were recorded.

3.3 Algoma Steel: Terminal Basins

The environmental investigation of these terminal basins involved two sampling techniques. First; an investigation of evaporative emissions from the surface of these resevoirs (sampling performed at a height of 2 metres above the surface) and secondly; downwind and off-plant property monitoring.

For the measurements obtained just above the surface of these basins, very low concentration levels were recorded for all contaminants. For example, the maximum 30-minute average concentrations of CO, TRS, SO₂ and NO_x were only 0.55, 0.002, 0.006 and 0.009 ppm respectively and the average total hydrocarbon loading as determined from 6 GC samples was only 116 ug/m³. For the hydrocarbons, an average of 32 specific organics were detected in these six samples with the aromatic fraction dominating and accounting for 66% (an average loading of 76 ug/m³) of these totals and the alkane fraction 30% (an average loading of 35 ug/m³). For the aromatics, the concentrations of the BTX's and 1-isopropyl-4-methylbenzene were the most significant with the loadings of 24, 15, 12 and 12 ug/m³ respectively. As noted in Table #3, the loadings of the lower ordered alkanes were essentially at background levels and much lower than the aromatics, thus these GC results were deemed to be indicative of a pure evaporative source.

Off-plant property monitoring downwind of these basins resulted in similar concentrations for the common contaminants as those measured above the surface. For example, the overall average concentrations of CO, TRS and SO₂ were essentially identical but there was a slight increase in NO_x - now at 0.024 ppm as compared to 0.006 ppm. For the hydrocarbons, a significant increase in loadings was noted. From the 2 GC samples, the average total hydrocarbons loadings was now 402 ug/m³ with the alkane fraction comprising 43% (or an average of 17 ug/m³) of these loadings; the aromatic fraction 35% (138 ug/m³); the cycloalkanes 19% (75 ug/m³) and the alkenes 4% (16 ug/m³). Once again, a relatively low number of organics were detected in these samples (38) and upon examining the respective loadings of these individual organics, evidence of not only evaporative but also combustion type source contribution was noted. For example, now the low ordered alkanes loadings were significant (especially cyclopropane at 136 ug/m³) and the relative loading of the alkane to aromatic fractions was now essentially equal whereas for the direct sampling taken 2 metres above the surface of these basins, this ratio was 1:2. Finally and once again, the major aromatics detected in these downwind GC samples were the BTX's and 1-isopropyl-4-methylbenzene with respective loadings of 24, 26, 23 and 34 ug/m³.

A point of note for these GC samples acquired both above and downwind of these terminal basins was that very little chlorinated organics were detected in any of these samples and that the concentrations were at, near or below the detection limits of the field gas chromatographs - i.e. at or below 1 ug/m³.

In summary, for the monitoring programme carried out in the vicinity of the terminal basins of Algoma Steel, no exceedences of any applicable Environmental Standards, Guidelines or Criterion were recorded.

3.4 Domtar Limited

Domtar Limited operates a by-product plant located on Algoma property which utilizes the tars and coal gases from the coke ovens of Algoma Steel. MAMu #2 spent an afternoon (July 30) downwind of this refinery and acquired approximately 2½ hours of common contaminant data and 3 GC samples in order to characterize the emissions from this 'targeted source'.

As can be seen from Table #2, the ground level concentrations of the common contaminants were similar to those reported for the other investigations carried out during this study. The overall average concentrations of CO, TRS, SO₂, NO_x and O₃ were 0.57, 0.005, 0.009, 0.016 and 0.023 ppm respectively. However, for the non-methane hydrocarbons, the overall average concentration was 1.98 ppm which is approximately 3 to 4 times greater than the concentrations reported for the other investigations of this study. (It should be reiterated that there is no Environmental Standard, Guideline or Criteria established for this contaminant, rather these measurements are used solely as a quantitative indicator for the GC sampling programme.)

For the 3 GC samples acquired downwind of this plant, an average of 47 different organics were detected and the total average hydrocarbon loading was 468 ug/m³ of which the alkane fraction comprised 68% (an average loading of 319 ug/m³), the aromatic fraction 18% (84 ug/m³) and the alkene fraction 9% (44 ug/m³). Thus by far, the most dominant fractional group was the alkanes of which butane (67 ug/m³), 2-methylbutane (80 ug/m³), pentane (63 ug/m³), 2-methylpentane (23 ug/m³) and hexane (19 ug/m³) were the major organics detected. For the aromatics, the BTX and 1-isopropyl-4-methylbenzene loadings were 15, 15, 10 and 18 ug/m³ respectively.

Although the concentrations monitored downwind of Domtar were somewhat elevated, no Environmental Standards, Criterion or Guidelines were exceeded for any of these contaminants.

3.5 Overnight Measurements

During the nights, MAMu's #1 and #2 were plugged in to an external electrical power source at the corner of Huron and Queen Streets. The units were un-manned during these times and only air quality data characterized by the common contaminants was acquired.

As noted in Table #2, relatively low concentrations of TRS and O₃ and significant concentrations of CO, NO_x and SO₂ were measured during these periods. The maximum 30-minute average concentrations of TRS

and O₃ were 0.007 and 0.031 ppm whereas for CO, NO_x and SO₂, they were 4.09, 0.199 and 0.050 ppm respectively. Taking into account some wind-directional analyses performed on this data set together with the prominent meteorological phenomenon of nocturnal inversions during these periods, the close proximity of this site to Algoma Steel and this site being in a high density traffic area (border crossing), the higher concentrations of CO and NO_x were deemed to be due mainly to vehicular traffic whereas the higher concentrations of SO₂ were deemed to be attributed to the coke combustion of coke oven gases throughout the steel works of Algoma Steel.

3.6 Upwind Monitoring

Usually at some time during each monitoring day, the MAMu's would move upwind of the particular 'targeted' source and acquire air quality data for background determinations. Since the results of these monitoring periods were all somewhat similar during these 4 days, only one such period is presented herein for discussion. The GC samples acquired at these times usually had total hydrocarbon loadings ranging only up to 20 or 50 ug/m³ and were usually comprised of the low boiling alkanes. The reason for presenting only one such monitoring period here is to point out that although the measured concentrations of hydrocarbons and common contaminants were at or near background levels, CO concentrations were somewhat elevated and appeared to be ubiquitous throughout this entire area - a maximum 30-minute average concentration of 0.99 ppm was reported. The most probable source of this contaminant was deemed to be vehicular exhaust and the presence of the low boiling alkanes support this assumption.

4.

MAPS AND TABLES

Map #1 Sault Ste. Marie Area Map

Table #1 Monitoring Periods and Related Information

Table #2 Common Contaminant Summary

Table #3 GC Data Summary

Map #2 CO Pollution Rose

Map #3 SO₂ Pollution Rose

LOCATION OF MONITORING SITES - SSM'85 SURVEY

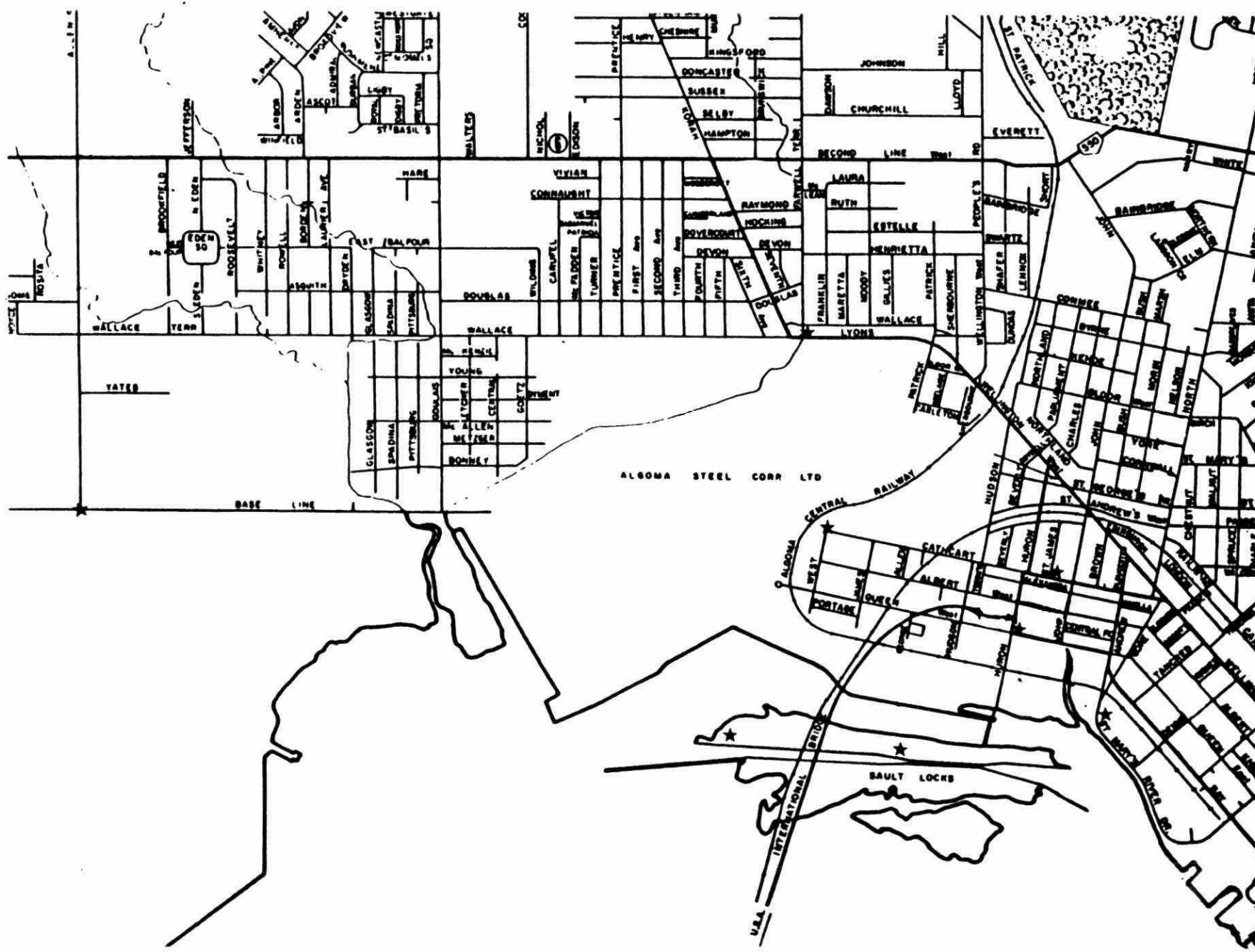


TABLE #1

MONITORING PERIODS and INFORMATION re. S.S.MARIE / 1985 SURVEY

Monitoring Period	Date	Start Time	Duration (Hrs)	# GC Samples	Location	Comments
A282	07/28	10:53	3.0	3	Farwell Terrace @ Lyons Avenue	Downwind Algoma
B282	07/28	10:55	2.2	0	Cathcart & James Streets	Downwind Algoma
B283	07/28	13:50	18.8	0	Queen & Huron Streets	Over- Night
A291	07/29	10:46	5.7	4	West end of S.L. Island*	Downwind Algoma
B292	07/29	11:30	0.8	1	St.Mary's River Dr. @ Gore St.	50m Dwnwd T. Basins
B293	07/29	12:39	1.7	2	West end of S.L. Island	Downwind Algoma
B294	07/29	14:41	1.4	1	Terminal Basin	2m above Surface
B295	07/29	17:06	15.8	0	Queen & Huron Streets	Over- Night
A302	07/30	10:33	1.8	1	St.Mary's River Dr. @ Gore St.	Dwnwd T. Basins
BD302	07/30	11:22	2.5	3	100m east of Domtar	Downwind Domtar
A303	07/30	12:38	3.5	5	Terminal Basin	2m above Surface
B305	07/30	14:39	0.7	0	Allen's Side Rd. @ Base line	Upwind Domtar
A304	07/30	16:40	16.5	0	Queen & Huron Streets	Over- Night
A312	07/31	11:15	1.0	1	West end of S.L. Island	Downwind Algoma
B312	07/31	12:36	1.2	0	West end of Cathcart St.	Downwind Algoma
A313	07/31	12:38	1.2	1	Main Office S.L. Island	Downwind Algoma
A314	07/31	13:59	2.2	1	West end of S.L. Island	Downwind Algoma
BB313	07/31	14:07	1.6	0	West end of S.L. Island	Downwind Algoma
B315	07/31	16:16	16.5	0	Queen & Huron Streets	Over- Night
A315	07/31	16:38	16.2	0	Queen & Huron Streets	Over- Night

* S.L. Island...Sault Lock Island

TABLE #2

COMMON CONTAMINANT SUMMARY
SAULT STE MARIE - 1985 AMBIENT AIR SURVEY

	ALGOMA STEEL		DOMTAR			Above
	Main Mill & Coke Ovens	Terminal Basins	Downwind	Overnight	Upwind	Terminal Basins
OVERALL AVERAGE GROUND LEVEL CONCENTRATIONS						
CO	1.64	0.47	0.57	1.00	0.91	0.49
TRS	0.003	0.001	0.005	0.002	0.001	0.001
SO ₂	0.019	0.005	0.009	0.008	0.005	0.005
TH-M	0.512	0.428	1.980	0.618	-	-
THC	1.418	1.272	3.108	-	1.945	1.351
NO _x	0.022	0.029	0.016	0.041	0.016	0.006
O ₃	0.024	0.024	0.023	0.016	0.023	-
MAXIMUM 30-MINUTE AVERAGE GROUND LEVEL CONCENTRATIONS						
CO	3.58	0.47	0.82	4.09	0.99	0.55
TRS	0.015	0.001	0.007	0.007	0.001	0.002
SO ₂	0.068	0.005	0.009	0.050	0.005	0.006
TH-M	1.400	0.445	2.255	1.680	-	-
THC	2.515	1.297	3.418	-	2.034	1.455
NO _x	0.081	0.073	0.024	0.199	0.017	0.009
O ₃	0.029	0.025	0.023	0.031	0.023	-

SSM DATA....1985

TABLE #3

As acquired during July of 1985

SUMMARY OF THE GC DATA

Number of Samples	Downwind Measurements			Head-space
	12	3	2	6
	ALGOMA	DOMTAR	TERMINAL BASINS	TERMINAL BASINS
	AVERAGE	AVERAGE	AVERAGE	AVERAGE
PROPANE	3.15	6.77	0.83	1.11
CYCLOPROPANE			136.42	1.43
2-METHYLPROPANE	8.35			
1,3-BUTADIENE		3.49		
BUTANE	9.11	66.90	26.48	3.64
2-METHYLBUTANE	10.40	79.53	72.09	3.64
1-PENTENE		1.43	2.07	
PENTANE	6.87	63.31	7.24	2.45
2-METHYL-1,3-BUTADIENE	1.86		5.21	1.71
TRANS-2-PENTENE	1.18	5.55	1.98	0.66
CIS-2-PENTENE	2.19	9.15	3.62	1.24
2-METHYL-2-BUTENE	2.01	22.85	4.64	1.12
2,2-DIMETHYLBUTANE	1.02	2.83		
3-METHYL-1-PENTENE			0.53	
CYCLOPENTANE	0.50	5.45		0.39
2,3-DIMETHYLBUTANE	0.95	4.90		0.44
2-METHYLPENTANE	2.80	22.77	16.92	1.09
3-METHYLPENTANE	1.73	14.39	10.35	0.61
1-HEXENE		1.49		
HEXANE	1.92	18.60	12.90	0.83
TRANS-3-HEXENE	0.27	1.49		
METHYLCYCLOPENTANE	0.71	7.80	6.04	0.47
BENZENE	14.80	15.14	24.14	24.45
CYCLOHEXANE	0.34	2.06		
2-METHYLHEXANE	0.73	8.20	2.04	0.77
2,3-DIMETHYLPENTANE	1.23	8.69	1.34	0.71
3-METHYLHEXANE	0.97	5.42	6.19	0.38
2,3-DICHLOROPROPENE		3.67		
TRICHLOROETHENE		1.57		
2,2,4-TRIMETHYLPENTANE	0.95	4.21		0.97
HEPTANE	0.69	2.96	4.28	0.28
1-CHLORO-3-METHYLBUTANE		0.99		
TRANS-2-HEPTENE		1.54		
METHYLCYCLOHEXANE	0.39	1.92		0.28
2,5-DIMETHYLHEXANE	0.26	1.05		
TOLUENE	6.09	15.28	25.68	15.37
2-METHYLHEPTANE	0.41	1.76	2.46	
4-METHYLHEPTANE	0.44	0.73	2.16	0.26
3-METHYLHEPTANE		1.66		
TETRACHLOROETHENE		3.06		
OCTANE	0.78	1.17	1.83	0.31
2-METHYL-1-HEPTENE	0.31			
CIS12DIMETHYLCYCLOHEXAN	0.50			
CHLOROBENZENE	0.50			
ETHYLCYCLOHEXANE			0.48	

PROPYLCYCLOPENTANE			0.71	
1-CHLOROHEXANE				2.23
ETHYLBENZENE	1.13	3.12	5.14	1.56
M-XYLENE	4.11	7.62	17.15	9.41
4-METHYLOCTANE		0.98		
2-METHYLOCTANE	0.57	0.70		
STYRENE	5.28			
O-XYLENE	1.28	2.02	5.75	2.94
1,2,3-TRICHLOROPROPANE			0.80	
NONANE	0.84	1.14	2.25	0.89
N-PROPYLBENZENE	0.94	1.01	0.84	
4-CHLOROTOLUENE	0.67	0.68	1.36	0.46
3-ETHYLTOLUENE	1.18	2.70	3.65	1.30
4-ETHYLTOLUENE	0.87		2.32	0.52
1,3,5-TRIMETHYLBENZENE	1.71	1.99	2.88	2.15
2-ETHYLTOLUENE	0.98	1.10	1.42	0.89
tert-BUTYLBENZENE	1.91		9.03	2.86
1,2,4-TRIMETHYLBENZENE				0.24
1-DECENE	3.92			
1,5-DICHLOROPENTANE				1.98
DECANE	1.94	2.56	2.74	2.90
SEC-BUTYLBENZENE	0.55			
3-(CHLOROMETHYL)HEPTANE				1.07
1,2,3-TRIMETHYLBENZENE	0.86	2.15		1.14
1ISOPROPYL4METHYLBENZENE	25.11	18.20	34.37	11.99
INDAN	1.32	9.29	2.24	1.86
N-BUTYLCYCLOHEXANE		0.58		
1,3-DIETHYLBENZENE			0.74	
1,4-DIETHYLBENZENE		1.42	1.28	1.52
N-BUTYLBENZENE				1.28
UNDECANE	2.50		3.78	3.66
DECAHYDRONAPHTHALENE	0.90		6.00	3.07
1235-TETRAMETHYLBENZENE	1.58	2.75		2.72
1234-TETRAMETHYLBENZENE		3.29		3.56
1234-TETRAHYDRONAPHTHALENE	1.63		3.88	1.36
DIISOPROPYLBENZENE				3.08
DODECANE	3.19	1.87	6.81	14.98
Total Compounds Identified	30	47	38	31.67
Total # of Peaks	67	95	102	99.83
Total Area of Peaks	4665	14812	17045	7180.90
Area of Identified Peaks	2603	10092	8265	2911.81
Area % Identified Peaks	52	68	51	40.24
Total hydrocarbons ug/m3:	109.1	467.7	401.6	115.77
Alkanes ug/m3	43.2	319.0	170.8	34.70
Cycloalkanes ug/m3	0.7	16.1	74.8	0.75
Alkenes ug/m3	6.5	43.8	16.0	2.96
Cycloalkenes ug/m3	0.0	0.0	0.0	0.00
Alkynes ug/m3	0.0	0.0	0.0	0.00
Aromatics ug/m3	58.5	84.2	138.2	75.72
Chlorinated alkanes ug/m3	0.0	1.4	0.4	1.58
Chlorinated alkenes ug/m3	0.0	2.8	0.0	0.00
Chlorinated aromatics ug/m3	0.2	0.5	1.4	0.08

S.S. MARIE 85: M0001

Start: 85/07/28 13:45 Scan: 300 sec. Ave: 60.0 min. Duration: 85.3 hrs.

Loc: MERGING OF ALL THE OVERNIGHT DATA...5 MP'S

WINDS Blowing From

1 Division = 10% of Time

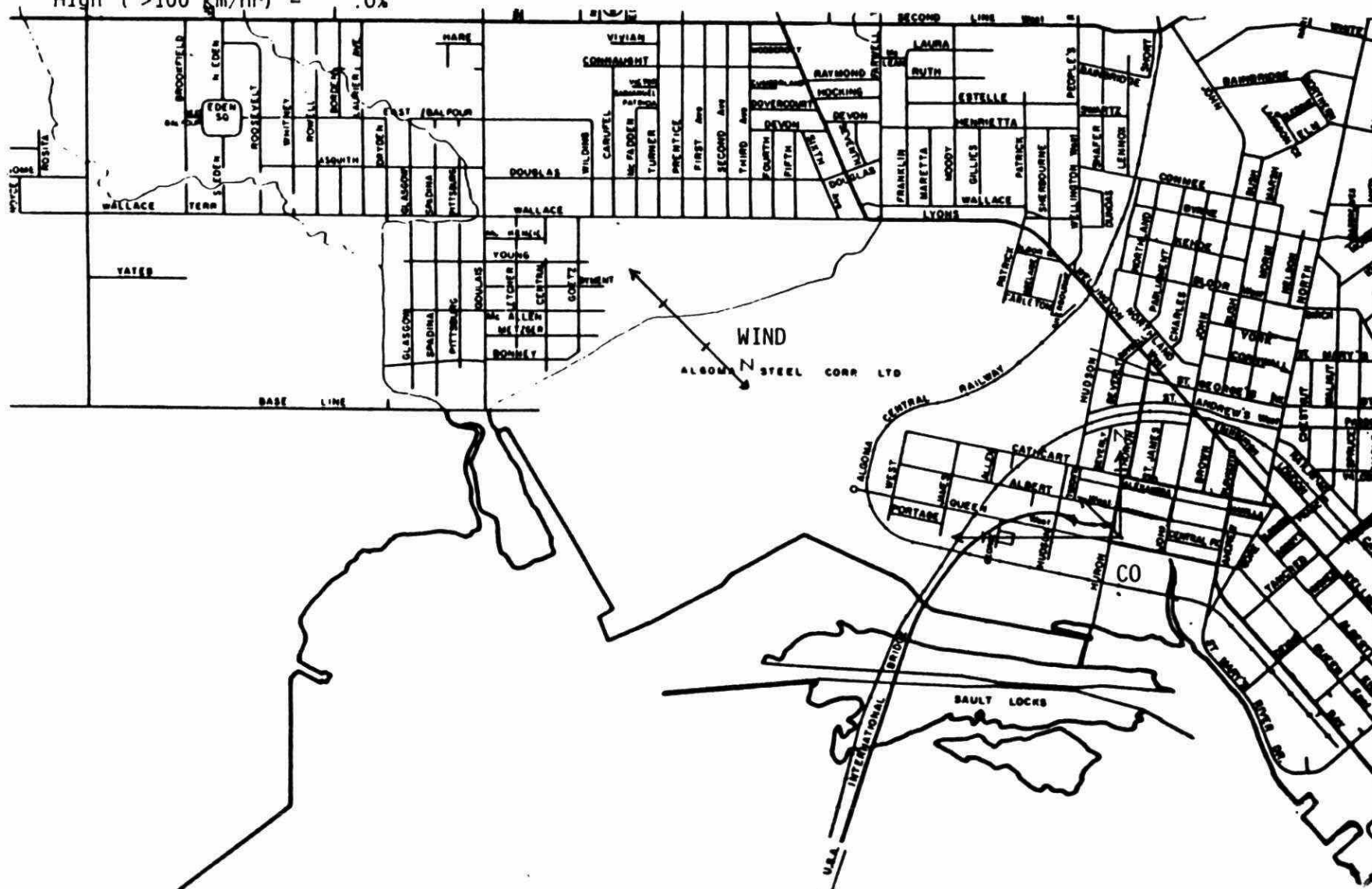
Calm (< 3 km/hr) = 62.4%

Low (< 3 km/hr) = .0%

High (>100 km/hr) = .0%

CO Blowing From

1 Division = 1 ppm --- A. MEAN



S.S.MARIE_85: M0001

Start: 85/07/28 13:45 Scan: 300 sec. Ave: 60.0 min. Duration: 85.3 hrs.

Loc: MERGING OF ALL THE OVERNIGHT DATA...5 MP'S

WINDS Blowing From

S02 Blowing From

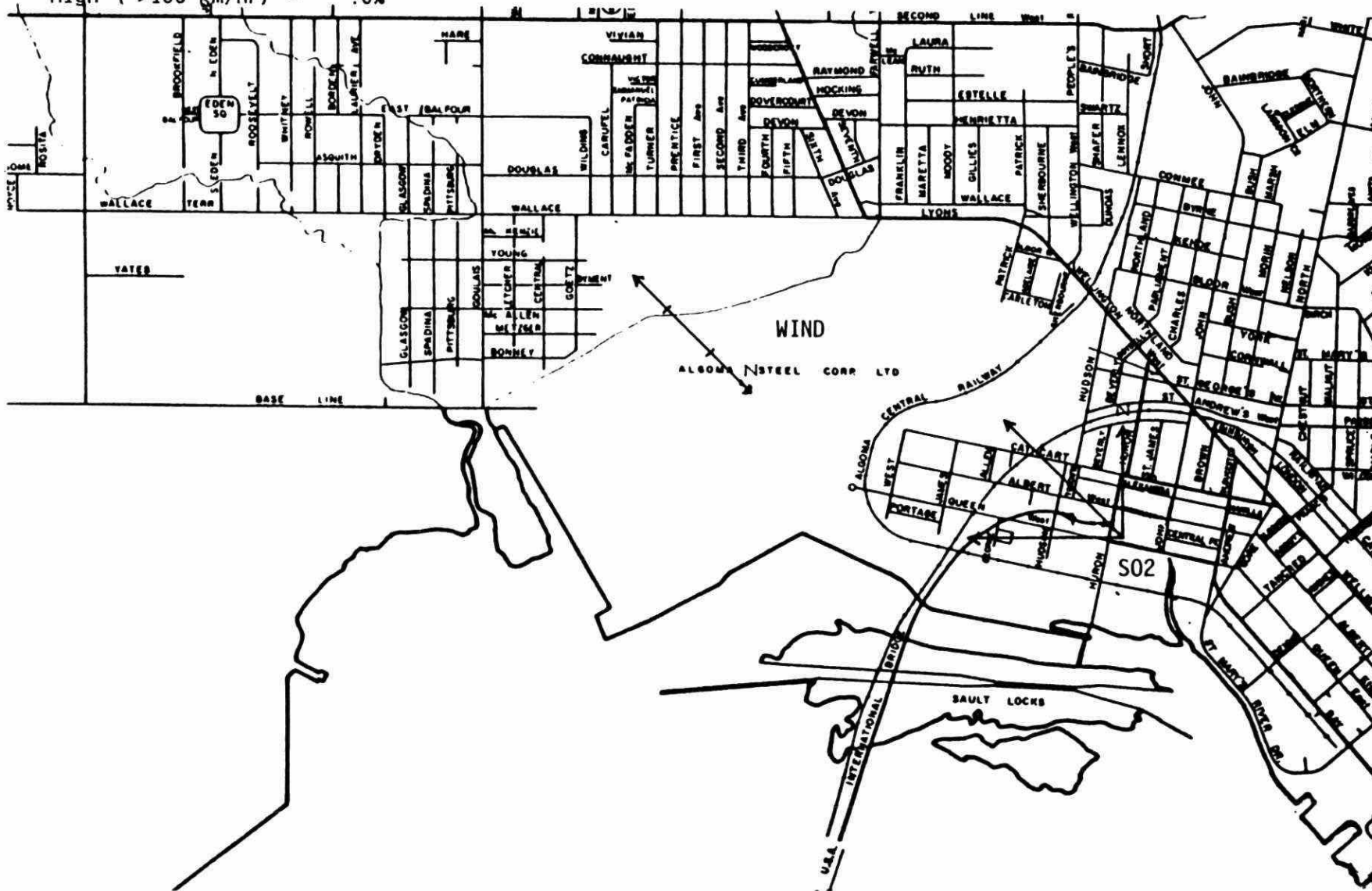
1 Division = 10% of Time

1 Division = .01 ppm -- A. MEAN

Calm (< 3 km/hr) = 62.4%

Low ($< 3 \text{ km/hr}$) = .0%

High (>100 km/hr) = .0%



TD
883 /
06
B452
1986